ANNALES HISTORICO-NATURALES MUSEI NATIONALIS HUNGARICI
Tomus 68. Budapest 1976.

Ants (Hymenoptera, Formicidae) from North Korea*

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Abstract — Account of Formidicae from N. Korea taken in 1970 and 1971. A total of 57 species are listed with accompanying notes; of these 38 are probably new records for the territory and 2 species, *Myrmica incurvata* sp. n. and *Plagiolepis flavescens* sp. n. are described. With 5 figures.

A collection of Formicidae resulting from two expeditions to the Democratic Peoples Republic of Korea (or North Korea) by research workers of the Hungarian Natural History Museum (Budapest) was sent to me through the courtesy of DR. JENŐ PAPP. Accounts of the two expeditions have been made by MAHUNKA & STEINMANN (1971) and by PAPP & HORVATOVICH (1972), respectively. Each of the more than 4000 mounted specimens has data labels with place of capture and locality number. Specimens with locality numbers 1–135 were taken during the 1970 expedition and 136–265 during 1971. There are literature references to species that have already been recorded from Korea which are noted in this paper but no previous published account of the ants of the area is known. Examination of comparative material from Japan sent by M. KUBOTA and M. KONDOH has greatly assisted in the identification of many of the species and an up to date nomenclature list of Japanese ants by KUBOTA (1971) has provided valuable literature references.

North Korea forms part of the Korean peninsula bordered east and west respectively by the Sea of Japan and the Yellow Sea and to the north is contiguous with the Chinese mainland and also with part of the USSR in the extreme northeast. There were four main collecting areas: South Pyongang Province with various collecting points within a 60 Km radius of Pyongyang City including lower mountain slopes up to 600 m asl. with a varied vegetation, mostly deciduous forest and clearings, river valleys and the City parks and gardens; Kaesong Province near the border with South Korea including Pakyon Mountain with mainly deciduous woodland, the neighbourhood of Pakyon waterfall and the grounds of a rest house; Kangwon Province to the southeast on and near the seashore; Ryang-gang Province including the high plateau of Sam-zi-yan and Pektusan mountains with collections made up to an altitude of 2000 m asl. in mixed pine forest representing the southern edge of the huge Siberian coniferous forest belt. This last area was of special interest because of the Palaearctic and Boreal species of the genera *Formica* and *Myrmica* collected there contrasting with the more Oriental Japanese fauna from the other areas.

A total of 57 species has been distinguished from the present collections, many of which are probably new records for the territory, but there are in addition 7 other species from Korea either mentioned in the list of Japanese Formicidae by KUBOTA (1971) or recorded in monographic revisions by various authors. The fauna as a whole includes some North European species but is clearly more closely linked with the Oriental faunas of Japan, China and Eastern Siberia. The complete list of Korean species as at present known is given here with their approximate ranges but here is little doubt that many more species remain to be added as the territory becomes further explored:

*Zoological Collectings by the Hungarian Natural History Museum in Korea, No. 29.

List of species	Provinces collected	General range
DOLICHODERINAE		
Dolichoderus sibiricus EMERY 1889	S Pyongan	China, Japan, Siberia
* *Tapinoma sinense* WHEELER 1925	S Pyongan	China
* *Tapinoma wroughtoni* FOREL 1904	S Pyongan	North India
* *Technomyrmex albipes* (F. SMITH 1861)	S Pyongan	Australasia
PONERINAE		
Pachycondyla astuta F. SMITH 1858	Kaesong	India, Sumatra, Java, China, Japan
! *Brachyponera chinensi* (EMERY 1894)		India, Sumatra, Java, China, Japan
Trachymesopus pilosior WHEELER 1928	Kangwon, S Pyongan	Japan
Ponera japonica WHEELER 1906	Kangwon, S Pyongan	Japan, Malaya, Java
* *Ponera scabra* WHEELER 1928	Kangwon, Kaesong	Japan
* *Proceratium watasei* WHEELER 1906	Kaesong	Japan
MYRMICINAE		
* *Myrmica ruginodis* NYLANDER 1846	Ryang-gang	North Eurasia
* *Myrmica silvestrii* WHEELER 1928	Ryang-gang	Japan
* *Myrmica kotokui* FOREL 1911	Ryang-gang	Japan
* *Myrmica sulcinodis* NYLANDER 1846	Ryang-gang	North Eurasia
* *Myrmica incurvata* sp. n.	Ryang-gang	Endemic
* *Myrmica yessensis* FOREL 1901	Ryang-gang	Japan
* *Myrmica angulinodis* RUZSKY 1905	Ryang-gang	Siberia, Japan
* *Myrmica kaczenkoi* RUZSKY 1905	S Pyongan	Siberia, Japan
* *Myrmica kurokii* FOREL 1907	Ryang-gang	Japan
Pristomyrmex pungens MAYR 1886	Kaesong, S Pyongan	Japan, Indomalaya
Myrmecina graminicola (LATREILLE 1802)	Ryang-gang, Kaesong, S Pyongan	S Palaearctic
Tetramorium caespitum (LINNAEUS 1758) (nec *jacoti* WHEELER 1923)	Ryang-gang, Kaesong S Pyongan, Kangwon	Holarctic
! *Strongylognathus koreanus* PISARSKI 1966		Endemic
! *Leptothorax koreanus* TERANISHI 1940		Japan
* *Leptothorax congruus* (F. SMITH 1874)	Kaesong	Japan
* *Leptothorax serviculus* RUZSKY 1902	Kaesong, Kangwon	Siberia, Mongolia
* *Leptothorax nassonovi* RUZSKY 1896	Kaesong, S Pyongan	Siberia, Mongolia
* *Leptothorax rabaudi* BONDROIT 1918	S Pyongan	S Europe, N Africa
* *Crematogaster matsumurai* FOREL 1901	S Pyongan	Japan
* *Crematogaster osakensis* FOREL 1900	Kaesong, S Pyongan	Japan
* *Stenamma owstoni* WHEELER 1906	Kaesong	China, Japan
* *Aphaenogaster ruida* WHEELER 1928	S Pyongan	Japan
Messor aciculatum (F. SMITH 1874)	Kangwon	China, Japan

* *Pheidole fervida* (F. SMITH 1874)	Kaesong S Pyongan	Japan
* *Pheidole pieli* SANTSCHI 1925	S Pyongan, Kangwon	China, Japan
* *Solenopsis japonica* WHEELER 1928	Kaesong, Kangwon	Japan
* *Monomorium pharaonis* (LINNAEUS, 1758)	S Pyongang	Cosmopolitan
* *Strumigenys lewisi* CAMERON 1887	Kaesong	China, Japan, Formosa
FORMICINAE		
* *Formica yessensis* FOREL 1901	Kaesong	Siberia, Japan
* *Formica lugubris* ZETTERSTEDT 1840	Ryang-gang	North Palaearctic
* *Formica sanguinea* LATREILLE 1798	Ryang-gang	Eurasia
* *Formica lemani* BONDROIT 1917	Ryang-gang	North Palaearctic
Formica japonica MOTSCHULSKY 1866	Kangwon, Kaesong	Japan, Mongolia, E Siberia
Lasius niger (LINNAEUS, 1758)	Ryang-gang, Kangwon, Kaesong, S Pyongan	Holarctic
Lasius alienus (FOERSTER 1850)	Kaesong, S Pyongang	Holarctic
* *Lasius hayashi* YAMOUCHI & HAYASHIDA 1969	Ryang-gang, Kaesong, Kangwon, S Pyongang	Japan
* *Lasius rabaudi* BONDROIT 1917	S Pyongang	Palaearctic
Lasius fuliginosus (LATREILLE 1798)	S Pyongang	Eurasia
* *Lasius crispus* WILSON 1955	Kaesong	Japan, Formosa
! *Lasius spathepus* WHEELER 1910		Japan
* *Lasius teranishii* WHEELER 1928	Kaesong	Japan
! *Lasius talpa* WILSON 1955		Japan, China
Paratrechina flavipes (F. SMITH 1874)	Kaesong Kangwon	Japan, Formosa
Paratrechina sakurae ITO 1914	Kaesong	Japan
* *Paratrechina sauteri* FOREL 1913	Kaesong, Kangwon, S Pyongang	Japan, Formosa
Camponotus herculeanus sachalinensis FOREL 1904	Kaesong, Ryang-gang	E Siberia, Mongolia
Camponotus japonicus MAYR 1866	Kaesong, Kangwon S Pyongang	Japan, China, E Siberia
Camponotus atrox EMERY 1925	Kaesong	China
! *Camponotus obscuripes* MAYR 1871		Japan, Sachalin
* *Camponotus quadrinotatus* FOREL 1866	Kaesong, S Pyongang	China, Japan
Polyrhachis lamellidens SMITH 1874	S Pyongang	China, Japan, Formosa
* *Plagiolepis mandzurica* RUZSKY 1905	S Pyongang	China
* *Plagiolepis flavescens* sp. n.	Kaesong	Endemic
! *Polyergus samurai* YANO 1911		Japan

*New records for Korea (38)
! Recorded for Korea but not in present collection
Total species 64

List of collecting sites

First Expedition — collections from 20 May 1970 to 10 June 1970, No. 1–135 (locality numbers)

South Pyongan Province: Nos. 2, 3, 5, 6 — De-sang san, 12 km NE of Pyongyan City: 2 = moss and soil litter from coniferous wood on hill, 3 = from ant nest on stony ground in ravine, 5 = by sweeping grass and shrubs, 6 = from under stones.

Nos. 13, 15 — NE outskirts of Pyongyan City: 13 = by sweeping grassy sides of stream, 15 = under stones.

Nos. 17, 19 — Bong-ha ri on river Te-dong, 45 km E of Pyongyan: 17 = from Berlese funnel soil extracts. 19 = by sweeping undergrowth.

Nos. 25, 26, 28, 29, 30, 31, 35 — Sa-gam po, 30 km N of Pyongyan: 25 = soil from *Castanea* copse, 26 = lakeside detritus, 28 = by sweeping at edge of forest by lake, 29 = by beating shrubs at edge of forest, 30 = under stones near lake, 31 = ant's nests under stones, 35 = ant hills.

No. 36 — Pyongyan, Nung-ra do, island in Te-dong river, by sweeping.

No. 37 — Pyongyan, Te-dong gang, woodland soil litter.

Nos. 38, 39 — De-sang san, 12 km NE of Pyongyan: soil from beneath oaks.

Kangwon Province: No. 44 — Wonsan sea-shore by sweeping herbage.

No. 49 — Se-sang ho, 50 km S of Wonsan, conifer wood litter on sand dunes.

Nos. 50, 52, 54 — Kum-gang san, environs of Go-song Hotel: 50 = litter from base of old oak, 52 = by sweeping stream sides, 54 = singling near Hotel.

Nos. 55, 56 — Kum-gang san, Sam-il po: 55 = soil below cliff at lakeside, 56 = by sweeping shrubs on slopes by lake.

Nos. 63, 64, 66, 67 — Kum-gang san, Man-mul san: 63 = soil litter from upland oaks, 64 = Berlese extract from ant nest, 66 = by sweeping shrubs, 67 = singling from waterfall.

No. 70 — Kum-gang san, Go-song chon, cliff vegetation.

No. 77 — Kum-gang san, Gurion popo, from wet soil litter.

No. 80 — Kum-gang san, Gurion chon, from moss litter under conifers.

No. 87 — Kum-gang san, Sam-il po — lakeside vegetation.

No. 88 — Kum-gang san, Go-song Hotel grounds — soil traps.

Kaesong Province: No. 95 — Pakyon san, De-hung sol, 30 km from Kaesong Town — from wet mossy soil litter.

Nos. 96, 99, 100 — Pakyon san, Pakyon popo, 27 km SW of Kaesong Town: 96 = moist mossy soil and litter, 99 = sweeping shrubs, 100 = singling from riverside vegetation.

No. 104 — Pakyon san near San-chon ri, 22 km SE of Kaesong Town by sweeping meadow.

Nos. 110, 112 — Pakyon san, San-chon tong, 20 km SE of Kaesong Town: 110 = under stones, 112 = by sweeping.

Nos. 118, 119 — Pakyon san, San-chon tong, 10 km from Kaesong Town: 118 = dry moss and soil litter, 119 = soil litter from base of *Castanea* trees.

Second Expedition — collections from 3 August 1971 to 12 September 1971, No. 136–263 (locality numbers)

South Pyongan Province: No. 137 — Pyongyan, City Park by sweeping herbage between Te-dong river and Hotel.

No. 140 — Mang-yong-dae, 25 km W of Pyongyan, by sweeping sparse vegetation.

No. 144 — Pyongyang Hotel garden, in Malaise trap.

Nos. 145, 146, 147, 152 — De-Sang san, 12 km NE of Pyongyang: 145 = sweeping in coniferous forest, 146 = singling in coniferous forest, 147 = forest floor litter, 152 = by beating trees and shrubs.

Nos. 154, 155 — Lyong-ak san, 25 km W of Pyongyan: 154 = singling in mixed forest, 155 = sweeping in mixed forest.

No. 157 — Pyongyang Hotel garden in Malaise trap.

Nos. 158, 159, 160 — Lyong-ak san by singling in mixed decidous conifer forest.

No. 164 — Sa-gam, 45 km N of Pyongyan, by sweeping riverside plants.

Nos. 168, 169 — Chang-lyong san, 50 km N of Pyongyan and 15 km E of Sa-gam by singling and sweeping sparse vegetation on stony slope.

No. 174 — Pyongyan, Nung-ra do, island in Te-dong river, by singling.

No. 178 — Bong-wa ri, Te-dong riverside, 45 km E of Pyongyan, singling in sparse vegetation.

No. 182 — Pyongyan, Nung-ra do, island in river Te-dong, by sweeping herbage in park.

No. 185 — Pyongyan Hotel garden by singling at light.

No. 186 — Za-mo san, 60 km NE of Pyongyan, singling in *Castanea* forest reserve.

Nos. 188, 189 — Pyongyan Hotel garden, in Malaise trap.

Ryang-gang Province: No. 193 — Hyesan Hotel garden, in Malaise trap.

Nos. 195, 196, 197, 202, 206, 207 — Chann Pay plateau, Sam zi-yan: 195 = singling in cleared *Betula/Larix* forest, 196 = sweeping in cleared forest, 1500 m, 197 = singling from flowers in *Betula/Larix* forest, 1700 m; 202, 207 = sifting soil and moss by Moczarsky—Szabó apparatus, 206 = singling in forest litter, 1700 m.

No. 211 — Mt. Pektusan, 2300–2600 m, singling above forest level.

Nos. 216, 217 — Mt. Pektusan, 1900 m, by singling and sweeping in upper forest levels.

South Pyongan Province: No. 224 — Lyong-ak san, 25 km W of Pyongyang, from baited soil trap in mixed forest.

No. 225 — Pyongyan Hotel garden, in Malaise trap.

No. 227 — Pyongyan City Park, by sweeping near river.

Nos. 230, 231, 232 — Za-mo san, 60 km E of Pyongyang by singling, sweeping and beating in *Castanea crenata* forest reserve.

No. 236 — Pyongyang Hotel, in room.

No. 237 — Pyongyang Hotel garden, in Malaise trap.

Nos. 238, 239 — Nam-po, Mts. Guk-san-gong, 10 km NE of Nam-po town, by sweeping in *Castanea/Pinus* wood with oak scrub and in Malaise trap.

Kaesong Province: Nos. 244, 263 — Pakyon Mountains.

Nos. 244, 245, 250 — Pakyon popo, 27 km NE of Kaesong by singling and sweeping near waterfall.

Nos. 249, 257 — Pakyon resthouse garden in Malaise trap.

Nos 254, 260, 261, 262 — by singling, sweeping and beating roadside shrubs and herbage between Kaesong and Pakyon popo.

No. 263 — 27 km NE of Kaesong at 500 m, in baited soil traps.

The species collected

DOLICHODERINAE

Dolichoderus sibiricus EMERY 1889 — Locality No: 231; South Pyongan: Za-mo san.

A single example of this arboreal species was taken by sweeping in sweet chestnut *(Castanea crenata)* forest. It is recorded from Eastern Siberia, Japan, China and Korea (KUBOTA 1971).

Tapinoma sinense WHEELER 1925 — Locality Nos: 28, 29, 31, 35, 36, 37, 244; South Pyongan Province: De-Sang san, Lyong-ak san, Sa-gam po, Nung-ra do (river island). Numerous ☿☿, 15 ♂♂.

This was taken in numbers in mixed decidous and coniferous forest by sweeping in clearings. Previous record are from China. The anterior clypeal border is emarginate but not incised; the antennal scape overreaches the occiput by 1/4 its length and the funiculus segments are clearly elongate. This species may well be synonymous with *T. emeryanum* (KUSN.—UGAM.) of Central Asia with a similar clypeal conformation.

Tapinoma wroughtoni FOREL 1904 — Locality Nos: 152, 231; South Pyongan Province: De-Sang san, Za-mo san.

A worker and 2 queens of this species were taken in sweet chestnut forest clearings. It is characterised by its short scape, which scarcely overreaches the occipital border, large eyes and shortened funiculus segments of which the second, third and fourth are

scarcely longer than broad. The clypeus is widely emarginate but not incised. This species is recorded from Kashmir.

Technomyrmex albipes (SMITH 1861) — Locality No: 147; South Pyongan Province: De-Sang san.

One male only of this wide ranging Afro-Asian species was taken. The antennal scape is about the length of the first two funiculus segments, its pale colour sharply contrasting with the rest of the antenna which is dark.

PONERINAE

Pachycondyla astuta SMITH 1858. (Syn. *Ectomomyrmex javanus* MAYR 1867) — Locality Nos: 254, 257. Kaesong Province: Pakyon popo, Pakyon Mountains. 6 ☿☿, 3 ♂♂.

A few examples of both males and workers were taken in the gardens of Pakyon Rest House and in roadside scrubby vegetation. This is a widely distributed Oriental species recorded from Japan, China, Indonesia and India (YASUMATSU 1962).

Brachyponera chinensi (EMERY, 1894) — This is another widely distributed Oriental species recorded from Korea (KUBOTA 1971) not taken in the present collections.

Trachymesopus pilosior WHEELER 1928 — Locality Nos: 64, 119. Kaesong Province: Pakyon san, San-chong Tong, — Kangwon Province: Kum-gang san, Man-mil san. 7 ☿☿.

This is an endemic species only recorded from Japan and Korea. It is characterised by dense pubescence and markedly hairy appendages. The petiole is furnished with numerous long erect hairs which are more sparsely disposed over the rest of the body.

Ponera japonica WHEELER 1906 — Locality Nos: 37, 50, 55, 63, 97, 147. South Pyongan Province: De-Sang san, Pyongyan, Te-dong gang. — Kangwon Province: Kum-gang san, Man-mil san. Kaesong Province: Pakyon-san, Pakyon popo. 16 ☿☿.

Samples were collected in forest litter and in environs of Man-mil san Hotel. This was recorded from Korea at Shakuoji by TERANISHI (1940). It is widely distributed in Japan, Indonesia and Malaya and has been recharacterised by TAYLOR (1967).

Ponera scabra WHEELER 1928 — Locality Nos: 80, 95, 96, 110. Kaesong Province: Pakyon-san, De-hung-sol near Pakyon popo, San-chon tong. Kangwon Province: Kum-gang san, Gu-long chon.

This species has hithero only been recorded from Japan (TAYLOR 1969). It is larger and more deeply sculptured than *P. japonica*. I am grateful to Mr. BARRY BOLTON of the British Museum (Nat. Hist.), London, for confirming the identity of these two *Ponera* species.

Proceratium watasei WHEELER 1906 — Locality No 119. Kaesong Province: Pakyon-san, San-chong tong.

A single specimen only of this species hitherto only known from Japan was taken in soil litter.

MYRMICINAE

Myrmica ruginodis NYLANDER 1846 — Locality Nos: 197, 207. Ryang-gang Province: Chann Pay plateau, Sam-zi-yan, 1700 m, 1 ☿, 1 ♀, 2 ♂♂.

The few examples taken by sifting moss are typical in all respects of this common wide-ranging North Palaearctic species. The subspinal area is cross-striated, the petiole is large and dorsally truncated and the propodeal spines are long as in European examples.

Myrmica kotokui FOREL 1911 — Locality No: 196. Ryang-gang Provice: Chann-Pay plateau, Sam-zi-yan, 1500 m. 2 ☿☿, 1 ♀.

A few workers were taken by sweeping in cleared *Larix betula* forest. This is very similar to *M. ruginodis* NYL. but the propodeal spines are proportionately shorter, the subspinal area is smooth and shining without striae, the post-petiole is narrower in profile and the sculpture rather weak as in *M. rubra* L. of Europe.

Myrmica silvestrii WHEELER 1928 — Locality Nos: 206, 211. Ryang-gang Province: Chann-Pay plateau, Sam-zi-yan, 1700 m; Mt. Pektusan, 2500–260 m. 88 ☿☿, 16 ♂♂, 1 ♀.

This is given as a synonym of *M. ruginodis* NYL. by KUBOTA (1972). However the specimens correspond exactly with WHEELER's description and with samples so named in collections from Japan. The workers are of large size; the subspinal area is smooth without striae, the colour deeper and more distinctive than in average samples of *M. ruginodis*. The back of the head has coarse reticulate sculpture and the dorsum of the alitrunk is coarsely rugulose with an overall lateral pattern. The males are considerably darker than in *M. ruginodis* and the whole alitrunk dorsum is coarsely striated unlike *M. ruginodis* which is smooth and shining between the Mayrian furrows.

Myrmica kurokii FOREL 1905 — Locality No: 217. Ryang-gang Province: Mt. Pektusan, 1900 m. 12 ☿☿.

This characteristic Japanese species was taken by sweeping in *Larix-Betula* forest. It resembles *M. silvestrii* WH. in colour and size but the antennal scape is thicker and more strongly curved, the fourth funiculus segment is quadrate not elongate, the head is more square and the petiole node thick and rounded without the distinctively flattened dorsal surface of *M. ruginodis* and *M. silvestrii*. The epinotal spines are strong but distinctly shorter while the subpetiole ventral tooth is thinner and shorter than in *M. silvestrii*.

Myrmica sulcinodis NYLANDER 1846 — Locality No: 202. Ryang-gang Province: Chann-Pay plateau, Sam-zi-yan, 1700 m. 3 ☿☿.

The few examples taken in soil litter in *Betula-Larix* forest resemble weakly sculptured *M. sulcinodis* a North Palaearctic and mountain species which is also recorded from Siberia and Mongolia (PISARSKI 1969). The frontal triangle is longitudinally striated as in *M. sulcinodis* but the spines are relatively longer and thinner. The meso-propodeal furrow is deeper and the frons more sinuate. This corresponds with the description of *M. yoshiokai* WEBER 1947 from Japan but is well within the range of variation of European *M. sulcinodis*.

Myrmica incurvata sp. n. (Figs. 1–3)

Locality No: 202. Ryang-gang Province: Chann-Pay plateau, Sam-zi yan, 1700 m, 12 ☿☿.

Described from 12 ☿☿ taken at 1700 m in forest litter at Sam-zi-yan on the Chann-Pay plateau, Ryang-gang Province by J. PAPP and S. HORVATOVICH, 26 August 1971. Holotype and paratypes in the Hungarian Natural History Museum, Budapest.

A series of workers taken in forest litter exactly resemble *M. forcipata* RUZSKY in their small size, short steeply angled petiole and coarse blunt incurved propodeal spines. The antennal scapes however are not angulate as in that species but short thick and abruptly curved without trace of an angle. The sculpture is coarsely sulcate as in extremely sculptured *M. sulcinodis*.

☿. Length 3.9–4.2 mm. Sculpture including clypeus, head, alitrunk and petiole nodes coarsely longitudinally rugulose. Faint striae are present at base of

Fig. 1–3. *Myrmica incurvata* sp. n.: 1 = profile of alitrunk, 2 = dorsal view to show incurved propodeal spines, 3 = antennal scape as seen from behind. — Fig. 4. *Myrmica forcipata* RUZS.: antennal scape (for comparision).

gaster and striae extend into upper part of the sunken frontal triangle. The infra spinal area is smooth and shining except for one of two faint cross striae on the upper part. — Colour: ochreous brown to brownish black. — Head as long from the occiput to the clypeal border as its maximum width across the eyes. Head width across eyes, width across frontal lobes and width of the narrowest part of the frons have the respective ratios 241 : 100 : 82.5. The antennal scape is sharply curved at the base as in *M. sulcinodis* NYL. without trace of an angle or process at the bend. The propodeal spines are directed upward in profile at an angle of about 60°. From above the spines are short, blunt with incurved tips so that the space between the tips is shorter than that between their bases. In profile the short petiole node rises steeply to a short peaked dorsal area which descends without break evenly to its junction with the post petiole which is distinctly higher than wide in side view.

Differs from the very similar *M. forcipata* RUZSKY only in the absence of a sharp angle at the bend of the scape, the slightly broader frons and the near absence of striae on the infra spinal area which is coarsely striate in *M. forcipata* RUZSKY.

Myrmica angulinodis RUZSKY 1905 — Locality No: 197. Ryang-gang Province: Chann-Pay plateau, Sam-zi-yan, 1700 m. 3 ☿☿.

Workers were taken in soil litter. This is a well characterised species of the *M. scabrinodis* NYL. species-group. The scape is very sharply angled with a minute almost indiscernible tooth-like process at the bend. The petiole node is short abruptly angled and almost conical. It is recorded from E Siberia: RUZSKY (1905), COLLINGWOOD (1962), and Mongolia: PISARSKI (1969).

Myrmica kasczenkoi RUZSKY 1905 — Locality Nos: 158, 231. South Pyongan Province: Za-mo san, Lyong-ak san. 6 ☿☿.

This is another species of the *M. scabrinodis* NYL.-group swept in *Castanea* forest and extracted from soil litter. It is distinguished by the more domed petiole node which is not anteriorly concave as in *M. scabrinodis*. The scape process has a slight ridge at the bend; the frontal area is coarsely striate and the subspinal area feebly cross-striate. KUBOTA (1971) does not list this species from Japan but I have specimens sent by him from Nagamo collected in 1967.

Myrmica yessensis FOREL 1901 — Locality Nos: 80, 202. Ryang-gang Province: Chann-Pay plateau, Sam-zi-yan, 1700 m. 7 ☿☿.

This species taken in soil litter in *Betula-Larix* forest has features that resemble both *M. lobicornis* NYL. and *M. schencki* EM. of Europe. The male from Japanese samples sent by KUBOTA has the scape configuration of *M. lobicornis* and the worker head shape and antennal lobe are within the range of that species but the dorsal outline of the alitrunk and the cubical post-petiole are more like those of *M. schencki*. KUBOTA (1971) lists *M. lobicornis* from Japan and *M. schencki* has been recorded from China and it is possible that both may be referable to the single Oriental species *M. yessensis* FOREL.

Stenamma owstoni WHEELER 1906 — Locality No: 110. Kaesong Province: Pakyon san, San-Chong Tong.

One worker only of this characteristic large-eyed species was taken. YASUMATSU & MURAKAMI (1960) give the known distribution as S Kansu in China and Honshu, Shikoku and Kyushi Provinces in Japan.

Pheidole pieli SANTSCHI 1925 — Locality Nos: 50, 63, 64, 88. 119, 237. South Pyongan Province: Bong-ha ri. — Kangwon Province: Kum-gang san Hotel garden, Sam il po; Gosang; Man-mul san. 40 ☿☿.

This small yellow species is recorded from Japan and China.

Pheidole fervida SMITH 1874 — Locality Nos: 31, 50, 55, 249, 257. Kaesong Province: Pakyon popo, rest house garden. — South Pyongan Province: Sa-gam po. 12 ☿☿.

The collection includes small workers only of this Japanese species.

Aphaenogaster ruida WHEELER 1928 — Locality Nos: 3, 6, 19, 153. South Pyongang Province: De-sang San, Bong-ha-ri on river Te-dong. 30 ☿☿, 4 ♂♂.

The workers of this species are distinguished from the more widely distributed *A.*

famelica F. SMITH by the coarser sculpture and more pronounced mesonotal hump. They are deep brown red with orange yellow legs, the propodeal spines are long and stout and the head coarsely rugulose/reticulate. Males of this species-group have not been fully described but those in the collection ascribed to *A. ruida* have a pronounced spur directed backward at the lower sides of the propodeum forming a sort of socket into which the trochanter fits.

Messor aciculatus SMITH 1874 — Locality No: 44. Kangwon Province: Wonsan seashore. 10 ☿☿, 5 ♂♂, 1 ♀.

This is the only *Messor* species recorded from E Asia and Japan. The specimes collected near the seashore at Wonsan are characteristic.

Pristomyrmex pungens MAYR 1886 — Locality Nos: 118, 144, 164, 197, 224, 231, 232, 254, 289. South Pyongan Province: Pyongyan Hotel garden, Sa-gam, Chang-lyong san, Lyong-ak san, Za-mo san, De-sang san. — Kaesong Province: Pakyon Mountain, San-Chong Tong. — Ryang-gang Province: Chann-Pay plateau.

Numerous workers were taken by sweeping flowers on riversides and in forest clearings. This species is common and has a wide range in SE Asia although not previously recorded from Korea.

Myrmecina graminicola LATR. 1802 — Locality Nos: 50, 55, 147, 150, 211, 231, 295. South Pyongang Province: Za-mo san, Pyongyan Hotel garden, De-sang san. — Kangwon Province: Kum-gang san, Sam-il po. Kaesong Province: Pakyon san, Dehung sol. — Ryang gang Province: Mt. Pektusan, 2450 m. 7 ☿☿, 2 ♂♂, 1 ♀.

The Asiatic population is usually referred to *M. nipponica* WHEELER but examples from Korea and Japan including all castes do not appear to differ in any way from material from Europe and North Africa. The species is not recorded from a large intervening area of Siberia and Mongolia but these territories are still underrecorded and the same applies to several other European species that are known to occur in Japan.

Monomorium pharaonis (LINNAEUS 1758) — Locality Nos: 159, 188, 225, 236. South Pyongan Province: Pyongyan Hotel and gardens outside hotel.

These are typical examples of this abundant cosmopolitan species.

Solenopsis japonica WHEELER 1928 — Locality Nos: 50, 119. Kangwon Province: Kum-gang san, Hotel Go-nong. Kaesong Province: Pakyon san, San-Chong Tong. 16 ☿☿.

This species is said to have a more rectangular head than *S. fugax* LATR. of Europe which it otherwise much resembles.

Crematogaster matsumurai FOREL 1901 — Locality Nos: 5, 6, 144, 145, 152, 153, 154, 160, 185, 230, 231, 232, 245. South Pyongan Province: De-sang san, Lyong-ak san, Pyongyan Hotel garden, Za-mo san. — Kwanwon Province: Wonsan seashore. 85 ☿☿, 2 ♀♀.

The specimens appear fairly typical according to paratypes in the British Museum (London) from Japan with colour ranging from almost evenly brownish to bicoloured with the head and alitrunk paler than the gaster. The promesonotal suture is distinct. The propodeal spines are short and broad; the sculpture is shining with dilute pubescence and moderate standing pilosity.

Crematogaster osakensis FOREL 1900 — Locality Nos: 119, 231. Kaesong Province: Pakyon san, San-Chong Tong. — South Pyongan Province: Za-mo san. 13 ☿☿.

The examples are typical of this small clear yellow Japanese species which is akin to *C. sordidula* NYL. of Europe.

Strumigenys lewisi CAMERON 1887 — Locality Nos: 63, 95, 96. Kangwon Province: Kum-gang san. — Kaesong Province: Pakyon san, De-hung sol near Pakyon popo.

BROWN (1949) has reviewed this species among other Dacetini from Asia. It has been recorded widely from Japan, China and Formosa.

Leptothorax congruus SMITH 1874 — Locality No: 119. Kaesong Province: Pakyon san, De San-Chong Tong.

A large series of workers was taken of this characteristic Japanese species not previously recorded outside Japan.

Leptothorax koreanus TERANISHI 1940 — This is a species of the *L. acervorum* FAB.-group described by TERANISHI from Japan and Korea but not collected during the 1970, 1971 expeditions.

Leptothorax nassonovi RUZSKY 1905 — Locality Nos: 16, 17, 19, 95, 99, 137, 145, 164, 169, 225, 227, 238. South Pyongan Province: Bong-ha ri, Pyongyan Hotel garden and CityPrk,a Sa-gam. — Kaesong Province: Pakyon mountains, Guk-san-bong mountains.

This is an Eastern Siberian species not hitherto recorded from Korea. It is characterised by long strong curved propodeal spines, rounded uninterrupted dorsal outline of the alitrunk and rather long petiole. The petiole node has the anterior face slightly concave and rises to a blunt angle at the dorsal crest which slopes gradually to the junction with the post-petiole. The elongate head is longitudinally rugose and the antennal scapes do not reach the occiput. Head, gaster and antennal clubs are dark contrasting with reddish brown of the rest of the body and appendages.

Leptothorax rabaudi BONDROIT 1918 — Locality No: 38. South Pyongan Province: De-sang san. 17 ☿☿.

This series of workers are smaller than, but not otherwise distinguishable from, examples of this species from Spain, S France and Morocco. From the huge area separating Korea from the Mediterranean, this identification appears unlikely except that insufficient collecting of this genus has been done in the intervening areas. The specimens have the characteristic petiole shape of the nominate species with the front and dorsal surfaces meeting at a right angle, strong diverging spines, uniformly pale sculptured head, pale antennal clubs, appendages and alitrunk with only part of the middle gaster darker.

Leptothorax serviculus RUZSKY 1902 — Locality Nos: 82, 99, 100. Kaesong Province: Pakyon san, Pakyon popo. Kangwon Province: Kum-gang san, Gulong chon. 12 ☿☿.

This is rather similar to *L. tuberum* FAB. of Europe but with longer propodeal spines and more angulate petiole node. This is a short headed species with long antennal scapes over-reaching the occiput. The head is rugose and together with the antennal clubs entirely dark. The identification is tentative as the spines appear more upright than in RUZSKY's outline illustration.

Strongylognathus koreanus PISARSKI 1966 — This species was taken with *Tetramorium* recorded as *jacoti* var. *chinenae* SANTSCHI by PISARSKI from the Myohyang Mountains. It is interesting that a *Strongylognathus* species hitherto unrecorded from Japan was sent to me by KUBOTA from Washuzan, Hiroshima collected by S. OHSAWA, very similar to *S. koreanus* but with a more incavate occipital border and is apparently another species as yet undescribed.

Tetramorium caespitum (LINNAEUS 1758) — Locality Nos: 15, 28. 31, 44, 49, 52, 119, 137, 144, 147, 182, 199, 254, 256. South Pyongan Province: Pyongyang City Park, Nung-ra do island. — Kaesong Province: Pakyon Mountain, Pakyon popo, San-chon Tong. Kangwon Province: Wonsan, Si-sung Ho. — Kumgang san, Hotel garden. Ryanggang Province: Chann-Pay plateau, Sam-zi-yan, 1600 m.

A huge material of this species, about 40% of the total collection, was taken variously by sweeping, in Malaise traps, and collecting in scrubby grass. This species is evidently one of the most abundant. Typically coloured dark workers are indistinguishable from the European species but lighter coloured samples tend to have the alitrunk paler than head and gaster. YASAMUTSU (1962) synonymised *T. jacoti* WHEELER and *T. geei* WHEELER under *T. caespitum* but further study may be necessary to confirm the synonymy.

FORMICINAE

Formica yessensis FOREL 1901 — Locality No: 244. Kaesong Province: Mt. Pakyon, Pakyon popo. 60 ☿☿.

DLUSSKY (1967) synonymised Siberian samples named *F. yessensis* as *F. lugubris* ZETT. However this is a characteristic Japanese and E Asian species corresponding with FOREL's types and description. The female castes have the clypeal outline and elongate funiculus segments of the *F. truncorum* FAB. species-group. *F. yessensis* differs from the European *F. truncorum* by its smaller sized queens and males, the body hairs are shorter but very thick and erect hairs are nearly absent from the exterior surfaces of the tibiae and scapes. This species differs from *F. sinensis* FOREL China by the presence of long clypeal setae said to be absent in that species and the more dense body pilosity. The series of 60 workers were collected in deciduous forest.

Formica lugubris ZETTERSTED 1840 — Locality No: 197. Ryang-gang Province: Chann-Pay plateau, Sam-zi-yan 1600 m. 3 ☿☿.

A few workers were collected along a track in *Larix-Betula* forest. This species occurs throughout the Siberian taiga and is abundant also in Scandinavia and the main mountain areas of Europe including the Alps and Pyrenees where it may occur at altitu-

des up to 2000 m. It has been previously recorded as far east as Elizovo and Petropol in Kamchatka (COLLINGWOOD 1962) but although DLUSSKY (1967) maps it for Hokkaido in Japan it has not yet been recognised from there, all wood ant specimens so far seen from Japan being clearly identifiable as *F. yessensis*.

Formica sanguinea LATREILLE 1798 — Locality No: 216. Ryang-gang Province: Mt. Pektusan 1900 m. 12 ☿☿.

A few workers of this wide ranging species were taken near the upper forest level in clearings. DLUSSKY (1967) mapped this species eastward as far as Vladivostok but not Korea or Japan where KUBOTA (1971) has listed it and also sent examples for confirmation.

Formica lemani BONDROIT 1917 — Locality No: 196, 207, 216. Ryang-gang Province: Mt. Pektusan, 1900 m; Chann-Pay plateau, 1500 m and 1700 m. 15 ☿☿.

These worker specimens are typical of BONDROIT's species which is also recorded from Japan (KUBOTA 1971) and from where I have examples of all castes taken in the higher mountains.

Formica japonica MOTSCHULSKY 1866 — Locality Nos: 6, 7, 15, 29, 30, 36, 114, 140, 145, 146, 154, 155, 158, 206, 230, 231, 238, 239, 250, 261. South Pyongan Province: Mang-yong-dae, De-sang san, Nam-po, Lyong-ak san, Za-mo san. — Ryang gang Province: Chann-Pay plateau, Sam-zi-yan. — Kaesong Province: Pakyon Mountains, Pakyon popo, 500 m.

Numerous workers were taken in grassy vegetation, cleared forest and forest trackways and clearings. This species has been intensively studied by KONDOH (1968a, 1968b, 1969a, 1969b) in Japan where it is an abundant species in grassland and open ground where it makes deep subterranean nests. It has been recorded from Eastern Siberia (DLUSSKY 1967, COLLINGWOOD 1962).

Polyergus samurai YANO 1911 — This species has been recorded from Korea according to KUBOTA (1971). In Japan it enslaves *Formica japonica* (KONDOH 1969a).

Lasius niger (LINNAEUS 1758) — Locality Nos: 19, 25, 35, 37, 38, 56, 60, 104, 113, 114, 144, 164, 169, 175, 176, 186, 197, 202, 226, 238, 261, 270. Ryang-gang, South Pyongan, Kangwon-Kaesong Provinces.

This is the most wide ranging and abundant species in the Northern Hemisphere and in N Korea according to these collections takes only second place to *Tetramorium caespitum*. It was collected from many different habitats including hotel gardens, scrubby banks and riversides.

Lasius hayashi YAMOUCHI & HAYASHIDA 1970 — Locality No: 19, 30, 39, 44, 52, 54, 66, 110, 118, 119, 138, 155, 157, 176, 182, 194, 226, 230, 231, 232, 238, 245, 254, 261. South Pyongan Province: Pyongyan Hotel garden, Gug-san Bong, De-sang san, Za-mo san. — Kangwon Province: Kum-gang san. — Kaesong Province: Pakyon mountains. — Ryang-gang Province: Hyesan Hotel garden

This species has only recently been differentiated from *L. niger* from studies made in Hokkaido, Japan by YAMOUCHI & HAYASHIDA (1970). According to these authors the species has somewhat comparable habits to *Lasius brunneus* LATR. of Europe and is associated with timber and rotting trees, nesting in trees or roots. It is hard to distinguish from *L. niger* but is characterised by the paler more reddish colour of the head and alitrunk contrasting with the dark gaster and a more variable development of scape and tibial setae. The genal margins have few hairs and the standing hairs on the scape tend to be restricted to the distal third. It is more easy to distinguish from another bicoloured Japanese species *L. sakagami* YAMOUCHI & HAYASHIDA (1970) which has a thicker petiole scale, abundant hairs all round the head and on the scapes. In the Korean collections *L. niger* and *L. hayashi* were all mixed together with other species but it was possible to make an initial sorting out of the two species on general appearance and colour. WILSON (1955) did not recognise species in the *L. niger*-group other than *L. productus* WILSON, *L. niger* and *L. alienus* FOERST, and found difficulty in speparating the last two on the normally used character of presence or absence of scape and tibial hairs evidently through confusion in some series with the now recognised *L. hayashi*. This could well be equivalent to *L. emeryi* RUZSKY (1905) which was treated as a synonym of *L. niger* by WILSON (1955).

Lasius alienus (FOERSTER 1850) — Locality Nos: 13, 15, 99, 104, 140, 157, 164. South Pyongan Provice: Sa-gam, Pyongyan City Parks and hotel garden. — Kaesong Province: Pakyon san, Pakyon popo, San-chon ri. 20 ☿☿, 1 ♀.

YAMOUCHI & HAYASHIDA (1970) threw doubt as to whether this species recorded by many authors from Japan actually occurred there. The few Korean specimens from

the localities listed above, however, appear quite typical with scapes and fore tibiae completely bare of suberect hairs. In Europe this is a more xerophilous species than *L. niger* but according to the locality labels both species were taken in similar situations in parkland and on riverside banks.

Lasius talpa WILSON 1955 — This Japanese species was also recorded from Korea at Keijo in South Pyongan (WILSON 1955).

Lasius rabaudi BONDROIT 1917 — Locality No: 231. South Pyongan Province: Za-mo san.

A single worker by sweeping in *Castanea* clearing. This species is not uncommon in Japan but is otherwise known only from South Scandinavia and Central Europe to Spain. According to PISARSKI (personal communication) who has studied BONDROIT's types, true *Lasius rabaudi* may be restricted to Western Europe and the Central European and Japanese populations should be ascribed to *L. meridionalis* BONDROIT which was treated by WILSON (1955) as a junior synonym of *L. rabaudi*. Workers of either this species or the similar *L. umbratus* NYLANDER were reported by WILSON (1955) from Genzan in Korea.

Lasius fuliginosus (LATREILLE, 1798) — Locality No: 104. Kaesong Province.

One worker only of this wide ranging Palaearctic species was taken. It has been already recorded from Kongosan in Korea (WILSON 1955).

Lasius crispus WILSON 1955 — Locality No: 230. South Pyongan Province: Za-mo san.

Six workers were taken in *Castanea* forest by sweeping. This species characterised by WILSON and also studied by YAMOUCHI & HAYASHIDA (1970) was collected by YASUMATSU from Central Korea.

Lasius spathepus WHEELER 1910 — This is a quite common Japanese species also recorded from Central Korea near Seoul by WILSON (1955) but not taken in the present collections.

Lasius teranishii WHEELER 1928 — Locality No: 99. Kaesong Province.

This has been redescribed by YAMOUCHI & HAYASHIDA (1970) from numerous nest series discovered in Hokkaido, Japan. It has not hitherto been recorded from Korea where only on worker of this distinctive species was collected.

Paratrechina flavipes (SMITH 1874) — Locality Nos: 15, 50, 56, 87, 104, 112, 118. South Pyongan Province: Pyongyan City Parks, Hotel Garden. — Kaesong Province: Pakyon san, San-chon Tong, Pakyon popo. Kangwon Province: Kum-gang san Hotel garden. 21 ☿☿.

This is a common tramp species of wide distribution through Southeast Asia to the Middle East and recorded from Korea (KUBOTA 1971).

Paratrechina sakurae ITO 1914 — Locality Nos: 158, 169, 254. South Pyongan Province: Chang-lyong san, Za-mo san. — Kaesong Province: Pakyon Mountains. 40 ☿☿.

Specimens were collected from scrubby vegetation. It is recorded from Korea (KUBOTA 1971). This is a paler, smaller species than *P. flavipes* with only the apical half of the gaster darkened. The propodeum from above is narrower and the head more pubescent than in *P. flavipes*.

Paratrechina sauteri FOREL 1913 — Locality Nos: 32, 37, 55, 100, 112, 231. South Pyongan Province: Te-dong gang, Za-mo san. — Kangwon Province: Kum-gang san, Go-Song Hotel, Gan-son Tong. — Kaesong Province: Pakyon san, San-chong, Pakyon popo. Many ☿☿, 1 ♀.

This is a minute species much resembling a *Plagiolepis*. The 12 segmented antennae have the funiculus segments quadrate. The whole body is pubescent with scattered erect hairs over the whole dorsal surface. It was taken variously by sweeping in open ground and in *Castanea* clearings.

Camponotus herculeanus sachalinensis FOREL 1904 — Locality Nos: 112, 195, 197, 200, 207. Ryang-gang Province: Chann-Pay plateau, Sam-zi yan, 1500–1700 m, 8 ☿☿, 1 ♀.

The form represented in the collection is that described in the literature as *C. sachalinensis* FOREL. One specimen, a queen, is entirely black and another, a large worker, is also black; a series of smaller workers have the base of the alitrunk slightly reddish. In sculpture they conform to *C. herculeanus* but are very much darker than the typical European species. YASUMATSU & BROWN (1957) gave this form tentative synonymy under *C. herculeanus* but left the true for further study.

Camponotus obscuripes MAYR 1878 — This distinctive eastern species is recorded from Sachalin, Japan and Korea but is not represented in the present collections.

Camponotus japonicus MAYR 1866 — Locality Nos: 5, 8, 15, 19, 28, 54, 145, 146, 158, 163, 168, 169, 174, 178, 182, 186, 231, 234, 235, 238, 244, 250, 254, 260, 261, 263. South Pyongan Province: De-sang san, Lyong-ak san, Sa-gam, Chang-lyong san, Pyongyang: Nung-ra do, Bong-wa-ri, Za-mo san, Pyongyan Hotel garden, Nam-po: Guk-san-gong mountain. — Kaesong Province: Pakyon Moutains, Pakyon popo. 35 ☿☿, 3 ♂♂.

This was taken abundantly in a variety of habitats ranging from stony riverside banks to scrubby vegetation in *Castanea* and coniferous forest. It is a characteristic Japanese species recorded also from China, E Siberia and Korea.

Camponotus atrox EMERY 1925 — Locality Nos: 100, 114, 244, Kaesong Province: Pakyon Mountains, Pakyon popo. 28 ☿☿.

This has the alitrunk dull red with the gaster strongly pubescent and seems to be a distinctive species occurring together with *C. japonicus* in at least one locality and therefore not a geographical subspecies as tentatively suggested by YASUMATSU & BROWN (1957). It has been recorded from N Japan, Korea and Manchuria. TERANISHI (1940) also described it as *C. koreanus*.

Camponotus quadrinotatus FOREL 1866 — Locality Nos: 99, 230, 231, 245, 257. South Pyongan Province: Pyongan Hotel garden, Za-mo san. — Kaesong Province: Pakyon Mountain, Pakyon popo. 13 ☿☿, 1 ♀.

This was taken in *Castanea* forest clearings. It is recorded from Japan and China.

Polyrhachis lamellidens SMITH 1874 — Locality No: 158. South Pyongan Province: Lyong-ak san.

One worker was taken in mixed deciduous-coniferous forest. It has also been previously recorded from the Myohyang Mountains in Korea by HUNG (1962).

Plagiolepis mandzurica RUZSKY 1905 — Locality Nos: 36, 144, 145, 158, 160, 164, 224. South Pyongan Province: Nung-ra do, Lyong-ak san, Chang-lyong san, De-sang san Pyongyan Hotel garden.

This was taken in pitfall traps in deciduous forest and by sweeping in scattered vegetation on southwest slopes. The workers vary in colour from brownish yellow to shining black. The structure of the antennae with its long funiculus segments, the dilute pubescence and body outline are not apparently distinguishable from *P. schmitzi* SANTSCHI of Southwest Europe. No *Plagiolepis* species has been recorded from Japan but this species is widely recorded from China and Mongolia.

Plagiolepis flavescens sp. n. (Fig. 5)

Locality Nos: 87, 118, 119. Kaesong Province: Pakyon san, Sanchong Tong; Kangwon Province: Kum-gang san. 12 ☿☿.

A series of a few workers were taken. The body colour is bright shining yellow. The antennal funiculus has the 2nd, 3rd and 4th segment lengths as 1 : 1.3 : 2. It probably comes nearest to *P. maura* SANTSCHI of the Middle East but differs in

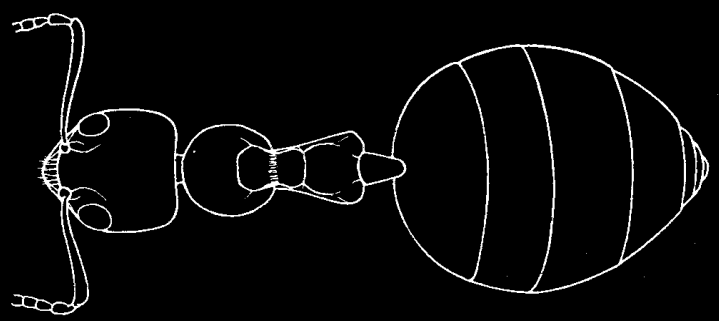

Fig. 5. *Plagiolepis flavescens* sp. n.: dorsal view to show general shape and striae on mid-body.

body outline and colour and is further distinguished by the short strongly etched longitudinal striae posterior to the mesonotal suture.

♀. Length 1.8–2 mm. Colour pale shining yellowish brown with on some specimens the antennal clubs and dorsum of hind gaster lightly infuscated. — Pubescence somewhat dilute over mid body but thicker on head and appendages. Long hairs are scattered over the dorsal outline with their greatest concentration on the front of the head and apex of gaster. — Funiculus segments. 2 and 3 transverse, 4th and following segments longer than broad. Approximate ratios of segments 2, 3 and 4 are as 1 : 1.3 : 2. Scape slightly over-reaching occiput. Alitrunk with pronotum wider than long; mesonotal area much shorter than wide and metanotum strongly constricted so that mid body at narrowest point half width of pronotum at its widest. Distinct short longitudinal striae are present extending from the post mesonotal suture.

Described from 10 ♀♀ from San-chon tong about 10 km from Daesong collected by MAHUNKA and STEINMANN, 8 June 1970. Two ♀♀ also taken at Kum-gang san in Kangwon Province. Holotype and paratypes in Hungarian Natural History Museum.

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